

## Basic and clinical science posters: epidemiology

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### Secondary use of Electronic Health Records (EHRs) in diabetes research: to what extent have we unlocked their potential?

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**Introduction:** Electronic health records (EHRs) provide an unparalleled opportunity for the use of routinely collected patient data to drive research. Diabetes research particularly stands to benefit, being a truly data-rich pathology with a wealth of extractable information. To date there has been no overarching assessment characterising the contribution of these methodologies to diabetes research.

**Methods:** Systematic literature review of articles published in both the medical and engineering research literature, over 10 years, accompanied by detailed critical appraisal. Particular attention is paid to the contribution of the UK General Practice Research Database, which represents a unique resource internationally.

**Results:** 467 articles were extracted, 72 meeting inclusion criteria. There was a significant increase in the publication rate over time. Methodologies have been developed to tackle a diverse range of research questions. Internationally, use of EHRs for diabetes research is most prominent in the United States (67% of articles), although such research typically involves smaller sample sizes (median 10,000 in US vs 675,000 in UK). The barriers most commonly described include missing values, misclassification and challenges establishing the generalisability of results.

**Conclusions:** Electronic health record research is an important and expanding area of healthcare research. There is enormous opportunity within the United Kingdom to develop these research methodologies. UK healthcare in particular stands to benefit based on the structure of its services and specifically unique national patient identifiers. Such a healthcare context may enable UK researchers to overcome many of the barriers encountered elsewhere and thus truly unlock the potential of electronic health records.

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### The distinct epidemiology of 'Type 3c' diabetes should prompt consideration of chronic pancreatic disease as the possible cause of a patient's diabetes

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**Aims:** The link between exocrine pancreatic disease and diabetes (termed Type 3c diabetes) has rarely been studied outside of selected secondary care populations. We identified people with likely Type 3c diabetes from primary care data in order to characterise the demographic indicators of when diabetes may be due to chronic pancreatic disease.

**Methods:** We performed a retrospective cross-sectional survey of all patients with diabetes (n = 73,096) in the Royal College of

General Practitioners Research and Surveillance Centre cohort (routine data collected from over one and a half million patients registered at primary care practices in England). We compared the demographics of those with coexisting pancreatic disease (here called 'pancreatic diabetes') to those without.

**Results:** People with 'pancreatic diabetes' (n = 551) developed diabetes at a significantly younger age than people with Type 2 diabetes (prevalence under 40 years of 11% vs 4%; p < 0.001), were more frequently of white ethnicity (94% vs 82%; p < 0.001) and far more commonly of low or normal body mass index (prevalence of body mass index [BMI] <25/m<sup>2</sup>.kg of 44% vs 16%; p < 0.001). Those with pancreatic diabetes had similar BMI to those with Type 1 diabetes (mean 26.5/m<sup>2</sup>.kg vs 26.3/m<sup>2</sup>.kg; p = 0.436), but were more commonly male (63% vs 55%; p < 0.001) and lived in areas of greater deprivation (median index of multiple deprivation score 17.0 vs 14.8; p = 0.049).

**Conclusions:** Specific attention should be paid to the possibility of underlying exocrine pancreatic disease when a patient presents with diabetes; particularly if they are younger, Caucasian, or of low or normal BMI.

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### Weight gain from birth to five years is associated with greater muscle strength, lean mass and insulin sensitivity, while gain from five to seven years is associated with greater fat mass and insulin resistance in young adults

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**Aims:** We hypothesised that critical periods of childhood weight gain are associated differently with fat and lean mass, and with muscle strength, accounting for different weight gain associations with insulin resistance (HOMA-IR).

**Methods:** Associations between early (0–5 years) and later (5–7 years) weight gain and (a) fat and lean mass (DEXA) at 11 and 17 years, (b) grip strength at 11 years and (c) HOMA-IR at 17 years were explored in 242 children with complete data from the 'Children in Focus' randomly selected subset of the Avon Longitudinal Study of Parents and Children (ALSPAC) birth cohort.

**Results:** Birth ponderal index and weight gain 0–5 years were associated with lower HOMA-IR at 17 (age, sex, body mass index (BMI) adjusted correlation coefficients(r): -0.13, p = 0.023 and -0.20, p = 0.014). Weight gain 5–7 years, and current BMI were associated with higher HOMA-IR (adjusted r:0.23, p = 0.010; 0.39, p < 0.001). Weight gain 0–5 years was associated with greater hand-grip strength at 11 years (adjusted r:0.30, p = 0.001) and lean mass at 11 and 17 years (r:0.44, p < 0.001; 0.23, p < 0.001), but not with fat mass (r:0.03, p = 0.4; 0.004, p = 0.9). Weight gain between 5 and 7 did not associate with lean mass or